

eastward to the eastern slope on the 23d, prevailed over the Mississippi and Ohio valleys and the Gulf States on the 24th, and on the south Atlantic coast on the 25th, the middle Atlantic states on the 26th, and New England on the 27th. During this eastward progress the minimum temperatures occurred as follows: In the Pacific states 23 to 32 on the 17th,

18th, and 19th; on the eastern slope 8 at lower stations and 2 at the summit of Pikes Peak; on the 24th, -10 at northern stations, +10 in the central and +40 at the southern limit; on the 25th, from 20 to 30 in the south Atlantic states; on the 26th, from 15 to 25 in the middle Atlantic states and lower lake region; on the 27th, from 2 to 27 in New England.

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for November, 1893, as determined by reports from about 2,000 stations, is exhibited on Chart III. In the meteorological tables the total precipitation is given for each station; the departures from the normal are given for regular stations of the Weather Bureau in the table of climatological data. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

NORMAL PRECIPITATION.

The normal precipitation for November is greatest on the coast of Washington and Oregon, and least in the extreme northwest, as shown by the following selected stations: Tatoosh, Wash., 11.9; Fort Canby, Wash., 8.2; Olympia, Wash., 6.5; Roseburg, Oregon, 3.6; Portland, Oregon, 6.0; Assiniboine, Mont., 0.6; Bismarck, N. Dak., 0.7; Fort Buford, N. Dak., 0.5; Cheyenne, Wyo., 0.3; Fort Custer, Mont., 0.4; Dodge City, Kans., 0.5; Las Animas, Colo., 0.2; North Platte, Nebr., 0.4; Saint Vincent, Minn., 0.6; Fort Sully, S. Dak., 0.4; Valentine, Nebr., 0.5; Yuma, Ariz., 0.3.

PRECIPITATION FOR NOVEMBER, 1893.

In November, 1893, the monthly precipitation was over 6 in southeastern Virginia and at Cape Hatteras, N. C., also in Louisiana, except near the mouth of the Mississippi. More than 6 fell at most stations in northern California and near the coast of Oregon and Washington. The maximum rainfalls were from 12 to 18 on the coast of Washington and Oregon; the exceptionally heavy rainfalls were 20 at a voluntary station near Roseburg and 34 near Portland. In the interior the precipitation has been mostly in the form of snow which, when melted, gave a maximum of 5.09 at Sault Ste. Marie, Mich., and 5.56 at Parry Sound, Ont. The stations that have reported no measurable precipitation during November have been confined generally to Arizona, New Mexico, eastern Colorado, western Kansas, and Nebraska.

DEPARTURES FROM NORMAL PRECIPITATION.

The precipitation was in excess of the normal at a few stations in the east Atlantic states and at most stations on the North Carolina and Virginia coasts, where the excess averaged about 3; a slight excess was also reported at Detroit and Port Huron, Mich., Davenport and Keokuk, Iowa. The principal area of excess includes Montana, Washington, Oregon, and northern California; the maximum excess was 7.3 at Eureka, Cal., 6.4 at Fort Canby, Wash., and 6.6 at Olympia, Wash.

Considered by districts, the monthly precipitation for November, 1893, when compared with the normal for the month, furnishes the following percentages; the precipitation is in excess when the percentages of the normal exceed 100: Middle Pacific coast, 204; northern plateau, 182; north Pacific coast, 159; northern slope, 121; middle Atlantic states, 112; west Gulf states, 98; middle plateau, 90; upper Lake region, 88; extreme northwest, 86; south Atlantic and east Gulf states, 81; lower lake region and upper Mississippi valley,

78; middle slope, 73; Ohio Valley and Tennessee, 66; Missouri Valley, 61; New England, 53; southern plateau, 41; south Pacific coast, 38; southern slope, 37; Key West, 19.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for November for a series of years; (2) the length of record during which the observations have been taken and from which the average has been computed; (3) the total precipitation for November, 1893; (4) the departure of the current month from the average; (5) the extremes for November during the period of observation and the years of occurrence:

State and station.	(1) Average for the month of Nov.	(2) Length of record.	(3) Total for Nov., 1893.	(4) Departure from average.	(5) Extremes for November.			
					Greatest.		Least.	
					Am't.	Year.	Am't.	Year.
<i>Arizona.</i>	<i>Inches.</i>	<i>Years.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	
Fort Apache	1.18	17	0.23	- 0.90	2.83	1890	0.00	1891
Fort Mohave	0.61	21	0.28	- 0.33	6.16	1888	0.00	*
Whipple Barracks	0.78	21	1.16	+ 0.38	3.18	1888	0.00	*
<i>Arkansas.</i>								
Keesees Ferry	4.34	12	2.51	- 1.83	8.85	1891	2.10	1892
<i>California.</i>								
Riverside	0.68	13	0.48	- 0.20	2.47	1888	0.00	1883, '91
<i>Colorado.</i>								
Las Animas	0.22	12	T.	- 0.22	0.70	1885	0.00	1890, '91
<i>Florida.</i>								
Merritts Island	2.26	15	1.99	- 0.27	5.67	1884	0.17	1886
<i>Georgia.</i>								
Forsyth	3.44	19	1.54	- 1.90	5.41	1888	0.50	1890
<i>Idaho.</i>								
Boise Barracks	1.09	20	3.14	+ 2.05	4.43	1874	0.00	1890
Fort Sherman	2.77	10	7.00	+ 4.23	7.00	1892-'93	0.29	1882
<i>Indiana.</i>								
Lafayette	3.24	11	2.65	- 0.59	6.31	1891	1.44	1884
<i>Iowa.</i>								
Cresco	1.46	22	0.84	- 0.62	5.20	1879	0.18	1875
<i>Kansas.</i>								
Independence	1.89	21	1.44	- 0.45	3.90	1876	0.06	1872
<i>Louisiana.</i>								
Grand Coteau	3.39	10	6.42	+ 3.03	6.42	1893	1.51	1890
<i>Maine.</i>								
Orono	4.57	23	1.43	- 3.14	8.76	1886	1.43	1893
<i>Maryland.</i>								
Cumberland	2.34	22	2.01	- 0.33	5.34	1889	0.82	1887
<i>Michigan.</i>								
Kalamazoo	2.61	17	2.09	- 0.52	5.77	1877	1.25	1882
<i>Missouri.</i>								
Sedalia	2.02	15	2.16	+ 0.14	3.17	1881	0.53	1885
<i>Montana.</i>								
Fort Custer	0.52	14	1.68	+ 1.16	1.68	1891-'93	0.05	1887
<i>Nebraska.</i>								
Fort Robinson	0.52	10	0.23	- 0.29	1.70	1885	0.07	1892
Genoa (near)	0.70	17	0.72	+ 0.02	1.43	1886	T.	1883
<i>Nevada.</i>								
Brown	0.20	21	.....	.....	1.39	1885	0.00	*
Carson City	1.63	16	1.49	- 0.14	7.01	1875	0.00	1884
<i>New Hampshire.</i>								
Hanover	3.66	22	0.94	- 2.72	6.62	1885	0.59	1882
<i>New Mexico.</i>								
Deming	0.81	11	0.06	- 0.75	1.80	1892	0.00	1886, '91
Fort Wingate	0.07	20	.....	.....	2.12	1878	0.00	*
<i>New York.</i>								
Cooperstown	3.08	22	2.20	- 0.88	4.72	1886	1.45	1876
Plattsburg Barracks	2.38	22	1.28	- 1.10	4.39	1885	0.54	1882
<i>North Carolina.</i>								
Lenoir	3.39	21	2.20	- 1.19	7.60	1877	0.00	1890
<i>Oklahoma.</i>								
Fort Reno	0.97	10	0.93	- 0.04	3.38	1884	0.00	1886, '92
Fort Sill	1.44	21	1.30	- 0.14	4.06	1890	0.19	1872
Fort Supply	1.01	13	0.70	- 0.31	3.30	1874	0.10	1886
<i>Oregon.</i>								
Bandon	6.16	15	14.04	+ 7.88	18.21	1885	0.33	1890
<i>Pennsylvania.</i>								
Dyberry	3.21	22	2.17	- 1.04	7.00	1886	1.40	1882
Grampian	3.03	17	1.72	- 1.31	6.03	1886	1.42	1872
Wellboro	4.28	14	3.00	- 1.28	9.07	1889	0.93	1890
<i>South Carolina.</i>								
Statesburg	1.85	12	2.19	+ 0.34	3.90	1882	0.87	1886
<i>South Dakota.</i>								
Fort Sully	0.42	22	0.55	+ 0.13	1.60	1886	0.00	1883

Departures from average precipitation—Continued.

State and station.	(1) Average for the month of Nov.	(2) Length of record.	(3) Total for Nov., 1893.	(4) Departure from average.	(5) Extremes for November.			
					Greatest.		Least.	
					Am't.	Year.	Am't.	Year.
<i>Texas.</i>	<i>Inches.</i>	<i>Years</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>		<i>Inches.</i>	
Austin	2.98	21	4.90	+ 1.92	7.53	1874	0.25	1879
Silver Falls	1.14	7	0.10	- 1.04	4.68	1888	0.03	1886
<i>Utah.</i>								
Terrace	0.36	19	0.70	+ 0.34	1.83	1874	0.00	•
<i>Vermont.</i>								
Strafford	3.43	20	1.75	- 1.68	6.20	1888	0.50	1874
<i>Virginia.</i>								
Dale Enterprise	2.63	13	2.40	- 0.23	6.46	1886	0.52	1882
<i>Washington.</i>								
Fort Townsend	2.83	18	5.31	+ 2.48	9.21	1874	0.39	1884
<i>West Virginia.</i>								
Parkersburg	3.01	8	2.07	- 0.94	4.96	1889	1.12	1892
<i>Wisconsin.</i>								
Madison	2.04	21	1.30	- 0.74	6.02	1879	0.40	1875
<i>Wyoming.</i>								
Fort Washakie	0.56	9	1.40	+ 0.84	1.40	1893	0.06	1890

*Frequently.

PRECIPITATION, JANUARY TO NOVEMBER.

For the period January to November, 1893, inclusive, the total precipitation was in excess over the Rocky Mountain plateau regions and the north and middle Pacific coasts by about 15 per cent of its normal value. Over the rest of the United States the total precipitation was deficient, and especially over the middle and southern Rocky Mountain slopes.

The precipitation for the current year, as compared with the normal for this period, furnishes the following percentages; the precipitation is in excess when the percentages of the normal exceed 100:

Northern plateau, 134; north Pacific coast, 125; southern plateau, 107; middle plateau, 105; middle Pacific coast, 105; middle Atlantic states, 98; Ohio Valley and Tennessee, 95; lower lake region, 92; south Atlantic states, 92; extreme northwest, 91; upper Mississippi valley, 89; New England, 88; upper lake region, 88; Missouri Valley, 86; east Gulf states, 84; northern slope, 78; southern Pacific coast, 77; Key West, 73; west Gulf states, 72; southern slope, 68; middle slope, 63.

YEARS OF GREATEST PRECIPITATION FOR NOVEMBER.

The precipitation for the current month is the largest on record at regular stations of the Weather Bureau as follows: at Norfolk, Va., 6.75, or 3.6 above the normal—the largest preceding being 6.4 in 1881; Astoria, Oregon, 17.41, or 9.7 above the normal—the largest preceding being 16.78 in 1892.

The greatest recorded precipitation for November occurred over the greater part of Louisiana and Arkansas in 1889; along the middle and south Pacific coasts in 1885; in the interior of the east Gulf and south Atlantic states in 1880; from the lower Missouri valley over the western lake region in 1879; and in Maryland, the District of Columbia, and Virginia in 1877.

YEARS OF LEAST PRECIPITATION FOR NOVEMBER.

The precipitation for the current month is the least ever reported for November at regular stations of the Weather Bureau, as follows: Albany, N. Y., 0.91, or 2.2 below the normal—the smallest preceding precipitation for November was 0.97 in 1882; Erie, Pa., 1.97, or 2.5 below the normal—the smallest precipitation during preceding Novembers was 2.51 in 1874.

In general the least precipitation for November was noted in the south Atlantic and east Gulf states, and from the Pacific coast eastward over the middle and northern plateau regions in 1890; in the extreme upper Mississippi valley in 1888; over the greater part of New England in 1882; over

Illinois, eastern Iowa, and eastern Missouri in 1875; and in the Ohio Valley in 1872.

EXCESSIVE PRECIPITATION.

The following tables for November, 1893, show, by states, the number of stations reporting total precipitation to equal or exceed 10.00 inches during the month; 2.50 in 24 hours, and 1.00 in 1 hour:

Monthly precipitation to equal or exceed 10.00.

State.	Number of stations.	State.	Number of stations.
Oregon	15	California	10
Washington	11		

Precipitation to equal or exceed 2.50 in 24 hours.

State.	Number of stations.	Dates.	State.	Number of stations.	Dates.
Louisiana	24	18, 18-19, 19, 25-26, 26, 26-27, 27-28.	Arkansas	3	20, 25-26, 26-27.
Oregon	12	2-3, 4, 4-5, 6-7, 7-8, 23, 23-24, 26, 27-28, 28-29, 29, 30.	Mississippi	3	25, 26-27, 27.
California	9	25-26, 26, 26-27, 26-27, 27.	Florida	2	4, 21-22.
Virginia	8	7-8, 7-9, 8, 8-9	Maryland	2	8-9, 9.
North Carolina	4	6-7, 7-8, 8.	Washington	2	4-5, 23-24.
Texas	4	13-14, 19-20, 25-26, 26.	Alabama	1	27.
			Missouri	1	27.
			South Carolina	1	6.
			Tennessee	1	26-27.

Precipitation to equal or exceed 1.00 in 1 hour.

State.	Number of stations.	Dates.	State.	Number of stations.	Dates.
Texas	4	20, 26.	Louisiana	2	18, 26.
Florida	2	4, 27.	South Carolina	1	6.

Table of excessive precipitation, November, 1893.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall 1 inch, or more, in one hour.		
		Am't.	Day.	Am't.	Time.	Day.
<i>Alabama.</i>	<i>Inches.</i>	<i>Inches.</i>		<i>Inches.</i>	<i>h. m.</i>	
Brewton	3.00	3.00	27			
<i>Arkansas.</i>						
Camden a	2.68	2.68	25-26			
Camden b	2.65	2.65	25-26			
Searcy	2.73	2.73	20			
Do	3.12	3.12	26-27			
<i>California.</i>						
Arcata	11.90	4.29	27			
Cloverdale	2.62	2.62	26			
Crescent City	13.10					
Crescent City Lighthouse	13.05					
Dunsmuir	11.35					
Eureka	3.70	3.70	26-27			
Fort Ross	15.07					
Georgetown	10.94					
Grass Valley a	2.50	2.50	26			
Gridley	2.63	2.63	25-26			
Mills College	2.88	2.88	25-26			
Shasta Springs	10.03	3.05	26-27			
Towles	10.63					
Trinidad Lighthouse	10.06					
Ukiah	3.63	3.63	25-26			
Upper Mattole	14.93	5.93	26-28			
<i>Florida.</i>						
Gainesville	3.65	3.65	21-22			
Jupiter	3.50	3.50	4	3.50	0 51	4
Titusville				1.00	0 45	27
<i>Louisiana.</i>						
Abbeville	3.00	3.00	26			
Amite	3.17	3.17	27-28			
Baton Rouge	3.33	3.33	26-27			
Clinton	3.32	3.32	26			
Coushatta b	2.60	2.60	26			
Covington	2.60	2.60	18	1.34	0 40	18
Do	2.90	2.90	26-27			
Donaldsonville	4.06	4.06	18-19			
Franklin	5.09	5.09	18-19			
Girard	2.72	2.72	26			
Hamburg	2.62	2.62	26			
Hammond	3.10	3.10	25-26			
Houma	3.37	3.37	19			
Lake Charles	2.50	2.50	18			
Lawrence	2.50	2.50	26			
Melville	3.00	3.00	26			
Minden	2.69	2.69	26			

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall in inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Louisiana—Continued.						
New Orleans	3.35	26-27	2.00	2 00	26	
Oxford	2.78	26				
Plaquemine	2.90	26				
Port Eads	2.73	26-27				
Roseland	3.50	26-27				
Sugar Experimental Station	3.69	26				
Wallace	2.86	18				
West End	3.16	26				
Maryland.						
Solomons	2.96	8-9				
Valley Lee	3.37	9				
Mississippi.						
Biloxi	3.85	25				
Hattiesburg	4.00	26-27				
Logtown	2.73	27				
Missouri.						
Glasgow	2.60	27				
North Carolina.						
Falkland	3.16	6-7				
Hatteras	6.16	7-8				
Weldon	2.51	7-8				
Wilmington	3.32	8				
Oregon.						
Albany a	10.58	3.58	28-29			
Astoria	17.41	2.65	2-3			
Aurora (near)	2.51	28-29				
Bandon	14.04	2.51	4-5			
Do	2.85	27-28				
Corvallis (near)	10.14					
Gardiner	16.53	3.51	28-29			
Glenora	34.88	3.77	4			
Do	10.40	10.40	7-8			
Do		6.56	23-24			
Do		2.56	26			
Do		3.06	29			
Hubbard		2.83	29			
Jacksonville		2.52	30			
Lafayette	12.41					
Langlois	20.42	2.56	23			
Do		7.30	28-29			
McMinnville a	11.57					
McMinnville b	10.94					
Newport	14.68					
Oregon City	11.08	2.97	29			
Salem b		3.00	29			
Springbrook	10.16					
Toledo	18.89					
Vernonia	15.14	3.03	6-7			
South Carolina.						
Simpsonville		2.57	6	2.57	1 05	6
Tennessee.						
Dyersburg		2.56	26-27			
Texas.						
Brenham	10.47	2.82	13-14			
Do		6.45	25-26			
Columbia			2.25	1 45	26	
Galveston			1.52	1 00	26	
Houston		3.17	25-26			
Stella		2.63	26	2.63	2 10	26
Sulphur Springs		3.89	19-20			
Tyler			1.10	1 00	20	
Virginia.						
Birdsnest		5.75	7-9			
Cape Charles		5.92	7-8			
Cape Henry		6.08	7-9			
Falls Church		2.64	8			
Hampton		5.53	7-9			
Norfolk		5.48	8-9			
Saluda		5.26	8-9			
Spottsville		5.24	7-9			
Washington.						
Aberdeen	14.37					
East Clallam	14.85					
Elbe	15.18					
Ferry	13.65					
Fort Canby	12.91					
Neah Bay	14.83	3.46	23-24			
Olympia	12.86					
Pysht	13.36	2.73	4-5			
Silver Creek	11.84					
Tatoosh Island	11.63					
Union City	13.05					

MAXIMUM RAINFALL IN ONE HOUR OR LESS.

The following table is a record of the heaviest rainfall during November, 1893, for periods of five and ten minutes and one hour, as reported by regular stations of the Weather Bureau furnished with self-registering rain gauges. This record refers strictly to rainfall; the frequent interruptions of the self-register, due to snow, explain the numerous cases of incomplete record.

Maximum rainfall in one hour or less.

Station.	Maximum rainfall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
	Inch.		Inch.		Inch.	
Atlanta, Ga.	0.05	21	0.09	21	0.33	21
Baltimore, Md.	0.03	8	0.05	8	0.23	8
Bismarck, N. Dak. *						
Boston, Mass. *	0.02	28	0.04	28	0.11	28
Buffalo, N. Y. *	0.05	22	0.06	22	0.20	22
Cincinnati, Ohio	0.05	2, 21	0.08	2, 21	0.30	21
Chicago, Ill. *	0.02	27	0.02	27	0.08	27
Cleveland, Ohio *						
Denver, Colo. *						
Detroit, Mich.	0.04	29	0.07	29	0.29	29
Dodge City, Kans. *	0.02	20	0.04	20	0.11	20
Duluth, Minn. *						
Eastport, Me. *	0.01	15	0.02	15	0.09	15
Galveston, Tex.	0.38	18	0.45	18, 26	1.52	26
Indianapolis, Ind.	0.10	21	0.14	21	0.43	21
Jacksonville, Fla.	0.11	27	0.18	27	0.48	27
Jupiter, Fla. *	0.34	4	0.68	4	3.50	4
Kansas City, Mo.	0.02	21	0.03	21	0.15	21
Key West, Fla.	0.04	14	0.07	14	0.13	14
Marquette, Mich. *						
Memphis, Tenn.	0.06	4	0.10	21	0.27	26
Milwaukee, Wis. *						
Nantucket, Mass.	0.06	13	0.09	13	0.25	13
Nashville, Tenn. *	0.05	21	0.08	4	0.30	21
New Orleans, La. *	0.35	21	0.64	21	1.00	26
New York, N. Y.	0.04	28	0.07	28	0.30	28
Norfolk, Va.	0.10	8	0.15	8	0.64	8
Olympia, Wash. *	0.06	7	0.10	7	0.44	7
Omaha, Neb. *						
Philadelphia, Pa.	0.06	27	0.07	4, 27	0.17	4
Pittsburg, Pa. †						
Portland, Me.	0.05	28	0.07	28	0.21	22
Portland, Oregon	0.05	5	0.07	5	0.20	28
Rochester, N. Y.	0.02	3	0.03	3	0.11	3
Saint Louis, Mo. *						
Saint Paul, Minn. *						
Salt Lake City, Utah	0.01	27	0.02	27	0.10	27
San Diego, Cal.	0.07	17	0.12	17	0.27	17
San Francisco, Cal.	0.06	24	0.07	24	0.25	24
Savannah, Ga.	0.28	27	0.47	27	0.58	23
Tampa, Fla.	0.25	27	0.40	27	0.90	27
Vicksburg, Miss. *	0.12	4	0.17	4	0.29	4
Washington, D. C. *	0.03	8	0.05	8	0.28	8
Wilmington, N. C.	0.03	27	0.05	27	0.23	21

* Record incomplete. † Self-register out of order. ‡ Less than 0.05 in 1 hour. § Estimated.

The following tables show the number of years for which monthly precipitation to equal or exceed 10.00 inches, daily precipitation to equal or exceed 2.50 inches, and hourly precipitation to equal or exceed 1.00 inch has been reported in the several states and territories for November during the last 24 years:

Excessive monthly precipitation.

State.	No. years noted.	State.	No. years noted.
Washington	14	Wisconsin	1
Oregon	11	Illinois	1
California	7	Kentucky	1
Maryland	4	Arizona	0
Texas	4	District of Columbia	0
Mississippi	4	Idaho	0
North Carolina	4	Indian Territory	0
Louisiana	3	Iowa	0
Arkansas	3	Maine	0
Massachusetts	3	Minnesota	0
New York	3	Missouri	0
Florida	2	Montana	0
Indiana	2	Nebraska	0
New Hampshire	2	Nevada	0
New Jersey	2	New Mexico	0
Tennessee	2	Ohio	0
Alabama	1	Rhode Island	0
Colorado	1	The Dakotas	0
Connecticut	1	South Carolina	0
Delaware	1	Utah	0
Georgia	1	Vermont	0
Kansas	1	Virginia	0
Michigan	1	West Virginia	0
Pennsylvania	1	Wyoming	0

Excessive daily precipitation (24 hours).

Louisiana	19	Florida	11
Texas	19	New York	10
North Carolina	18	Illinois	10
Alabama	14	Indiana	9
Tennessee	14	Arkansas	9
Massachusetts	13	Missouri	9
Georgia	12	Oregon	9
Mississippi	12	Connecticut	8

Excessive daily precipitation (24 hours)—Continued.

Table with 4 columns: State, No. years noted, State, No. years noted. Lists states like South Carolina, Washington, Maine, etc., with their respective precipitation frequency.

Excessive hourly precipitation.

Table with 4 columns: State, No. years noted, State, No. years noted. Lists states like Texas, Mississippi, Florida, etc., with their respective hourly precipitation frequency.

The following tables give exceptionally heavy monthly, daily, and hourly precipitation reported for November during the last 24 years:

Monthly.

Table with 6 columns: Station and state, Am't., Year, Station and state, Am't., Year. Lists stations like Glenora, Oregon; Crescent City, Cal; Delta, Cal, etc.

Daily (24 hours).

Table with 6 columns: Station and state, Amount, Date, Station and state, Amount, Date. Lists stations like Edmanton, Cal; Middletown, Cal; Los Gatos, Cal, etc.

Excessive daily precipitation—Continued.

Table with 6 columns: Station and state, Amount, Date, Station and state, Amount, Date. Lists stations like Dyersburg, Tenn; Franklin, La; Palestine, Tex, etc.

* October 31—November 1.

One hour and less.

Table with 6 columns: Station and state, Amount, Time, Date. Lists stations like New York, N. Y.; Galveston, Tex; New Orleans, La, etc.

* Record incomplete.

MONTHLY SNOWFALL.

The depth of snow that fell during the month of November, as reported by both regular and voluntary observers, is shown by the lines and figures on Chart VI, which also gives, by the full line, the limit at which minimum temperatures of 32° F. were at any time reported at the regular Weather Bureau stations; by the dotted line is given a similar limit for 40°.

Monthly snowfalls of five inches or more occurred as given in the following table, and in states where the maximum was below that amount the station reporting the greatest is given:

Snowfall of five inches or more, November, 1898.

Table with 4 columns: State and stations, Inches, State and stations, Inches. Lists stations like Newberg, Alabama; Flagstaff, Arizona; Cisco, California, etc.

Snowfall of five inches or more—Continued.

State and stations.	Inches.	State and stations.	Inches.
<i>Illinois—Continued.</i>		<i>Minnesota—Continued.</i>	
Chicago	7.5	Fort Ripley	6.0
Dixon	7.0	Grand Meadow	9.0
Galva	8.8	Hastings	10.0
Lagrange	9.0	Lake Winnibigoshish	12.4
Oregon	12.5	Leech Lake	11.0
Oswego	8.0	Long Prairie	12.5
Ottawa	6.0	Maple Plain	10.5
Riley	11.8	Marfield	9.0
Rockford	12.5	Mazeppa	8.0
Sycamore	12.0	Medford	6.5
Walnut	7.0	Minneapolis (W. B.)	8.2
Winnebago	10.0	Minneapolis a	10.8
<i>Indiana.</i>		Minneapolis b	8.7
Angola	3.5	Minneapolis c	7.3
<i>Iowa.</i>		Minnesota City	7.5
Alta a	6.2	New London	7.0
Audubon	8.0	Park Rapids	5.0
Belle Plaine	7.5	Pine River	7.0
Carroll	5.0	Pokegama Falls	8.1
Cedar Falls	5.5	Red Wing	5.5
Cedar Rapids	5.8	Royalton	12.0
Charles City	7.0	Saint Charles	7.0
Clinton	7.0	Saint Cloud	10.0
Cresco	6.0	Saint Paul	6.5
Davenport	5.5	Sandy Lake Dam	7.2
Delaware	5.5	Sauk Center	7.0
Des Moines	8.1	Wabasha	8.5
Dubuque	9.3	Waconia	8.5
Elkader	6.0	Winona	10.8
Fulton	10.0	<i>Mississippi.</i>	
Galva	7.9	Pontotoc	Trace.
Grand Meadow	8.2	<i>Missouri.</i>	
Hampton	7.8	Unionville	2.5
Hopkinton	7.3	<i>Montana.</i>	
Independence	6.5	Boulder	5.2
Iowa City a	7.0	Choteau	21.0
Larrabee	8.0	Cokedale	30.0
Logan	6.0	Deer Lodge City	7.5
Maquoketa	5.0	Elk Park	36.0
Mechanicville	14.0	Fort Custer	12.8
Monticello	10.5	Fort Logan	20.0
Newton	6.5	Fort Missoula	7.8
Osage	5.5	Glendive	12.5
Storm Lake	6.7	Great Falls	16.4
Tipton	10.0	Havre	6.0
Williams	5.4	Helena	12.5
<i>Kansas.</i>		Hogan	16.0
Downs	4.0	Martinsdale	23.5
<i>Kentucky.</i>		Miles City	7.6
Mount Sterling	Trace.	<i>Nebraska.</i>	
Sandy Hook	Trace.	Agee	5.0
<i>Maine.</i>		Arberville	5.0
Easton	10.0	David City	8.0
Mayfield	6.0	Geneva	6.0
<i>Maryland.</i>		Genoa	6.0
Mount Saint Marys	3.5	Hartington	9.0
<i>Massachusetts.</i>		Marquette	7.5
Monroe	13.5	Springview	5.0
<i>Michigan.</i>		Shanton	5.8
Allegan	12.5	Valentine	5.1
Alma	14.0	<i>Nevada.</i>	
Bear Lake	13.0	Fenelon	6.5
Bellaire	13.4	Halleck	5.0
Benton Harbor	6.8	Palmetto	7.0
Berrien Springs a	14.0	South Camp	5.5
Berrien Springs b	7.0	Stofel	10.0
Boon	30.7	Stoel	5.5
Calumet	30.2	Toano	12.0
Cheboygan	19.5	Tuscarora	25.0
Escanaba	7.1	<i>New Hampshire.</i>	
Fairview	5.0	Alstead	7.0
Fitchburg	12.0	Antrim	5.0
Gaylord	68.0	Berlin Mills	10.0
Grand Haven	10.7	Bethlehem	5.5
Grand Rapids	10.0	Concord a	5.5
Hanover	6.0	Dublin	7.0
Harbor Springs	20.0	Grafton	6.0
Hart	11.5	Plymouth	8.5
Hastings	11.9	Sanbornton	5.5
Kalamazoo	7.5	West Milan	7.0
Lansing	5.5	<i>New Jersey.</i>	
Lathrop	10.0	Deckertown	1.2
Lodi	29.0	<i>New Mexico.</i>	
Marquette	31.3	Chama	8.5
Mayville	5.5	Sulphur Hot Springs	5.5
Mottville	8.0	<i>New York.</i>	
Olivet	8.5	Alfred Center	12.0
Ovid	5.5	Angelica	10.0
Parkville	12.0	Arcade	23.5
Rockland	37.0	Baldwinsville	5.0
Saint Ignace	8.5	Brookfield	7.0
Sault Ste. Marie	30.6	Eden Center	28.0
Thornville	6.0	Friendship	9.8
Vandalia	11.5	Humphrey	24.0
Williamston	8.0	Le Roy	9.0
<i>Minnesota.</i>		Lowville	15.0
Ada	11.0	Number Four	19.8
Albert Lea	7.0	Oswego	5.5
Alexandria a	8.5	Palermo	6.2
Alexandria b	6.0	Port Jervis	7.0
Blooming Prairie	5.5	Rochester	6.1
Caledonia	13.9	South Canisteo	8.4
Cambridge	6.0	Turin	22.8
Carver	5.0	Varysburg	7.5
Clear Lake	7.0	Wedgwood	6.0
Clearwater	5.6	<i>North Carolina.</i>	
Duluth	6.4	Willington	1.5
Farmington	11.5		

Snowfall of five inches or more—Continued.

State and stations.	Inches.	State and stations.	Inches.
<i>Ohio.</i>		<i>Washington—Continued.</i>	
Bement	11.0	East Sound	5.5
Cleveland (W. B.)	6.3	Elbe	11.5
Cleveland (V. O.)	8.1	Fort Simcoe	24.0
Colebrook	13.5	Fort Spokane	19.1
Harbor	8.0	Lakeside	20.5
Hillhouse	11.0	Madrone	7.0
Wheeler	15.0	Moxee Valley	15.4
<i>Oklahoma.</i>		Olga	5.5
Fort Supply	1.0	Pine Hill	12.0
<i>Oregon.</i>		Pomeroy	9.8
Arlington	5.5	Port Crescent	8.7
Baker City	14.1	Rosalie	14.5
Crook	7.5	Spokane	16.0
Hood River (near)	15.0	Union City	7.0
Joseph	13.5	Waterville	22.0
Sparta	11.0	West Ferndale	13.9
The Dalles	12.0	<i>West Virginia.</i>	
<i>Pennsylvania.</i>		Pleasant Hill	3.0
Blue Knob	11.5	<i>Wisconsin.</i>	
Drifton	8.2	Amherst	16.5
Dyberry	7.5	Baraboo	11.0
Erie	5.7	Bayfield	14.0
Girardville	6.8	Beaver Dam	13.5
Saegerstown	8.0	Belleville	14.0
Salem Corners	6.0	Beloit	10.4
Shinglehouse	6.6	Black River Falls	16.0
Smithport	15.0	Butternut	6.5
Warren	6.0	Cadiz	7.3
<i>South Carolina.</i>		Chippewa Falls	13.0
Blacksburg	Trace.	City Point	12.5
<i>South Dakota.</i>		Columbus	18.0
Aberdeen	5.0	Delavan (near)	11.5
Ashcroft	5.5	Eau Claire	11.0
Bear Valley	6.8	Estella	10.5
Cross	5.0	Florence	12.5
Fort Meade	8.5	Fond du Lac	14.0
Gary	5.0	Grantsburg	9.0
Huron	7.1	Green Bay	11.4
Elkrichs	9.5	Harvey	9.4
Rosebud	12.0	Hayward	10.5
Spearfish	9.5	Hillsboro	11.0
Tyndall	6.0	Janesville	8.5
Wessington Springs	5.0	Koepenick	16.0
<i>Tennessee.</i>		La Crosse	7.9
Jacksboro	0.5	Lancaster	8.0
<i>Texas.</i>		Lincoln	10.1
Coldwater	0.8	Madison	6.5
<i>Utah.</i>		Medford (a)	15.5
Castle Gate	8.0	Medford (b)	9.0
Cisco	5.2	Menominee	7.7
Grouse Creek	6.0	Milwaukee	7.4
Heber	15.5	Neillsville	12.0
Kelton	5.5	New Holstein	18.5
Levan	5.0	Oconomowoc	9.5
Loa	10.8	Oconto	12.0
Moab	11.0	Osceola	7.8
Parowan	9.0	Pepin	8.0
Promontory	6.5	Portage	18.5
Singletree	26.0	Prairie du Chien	5.5
Terrace	7.0	Raymond	12.5
Thistle	10.6	Reedsburg	8.5
<i>Vermont.</i>		Sharon	14.0
Hartland	8.5	Sparta (b)	11.2
Irassburg	8.2	Stevens Point	17.0
Jacksonville	9.2	Valley Junction	10.8
Norwich	7.0	Viroqua	9.0
Simonsville	10.0	Watertown	8.8
Tecoma	5.5	Waukesha	6.5
Stratford	9.5	Westfield	13.2
Vernon	6.0	Weston	12.0
Wells	6.2	Whitehall	10.0
Woodstock	11.0	<i>Wyoming.</i>	
<i>Virginia.</i>		Big Horn Ranch	14.2
Dale Enterprise	2.5	Camp Pilot Butte	9.0
<i>Washington.</i>		Fort McKinley	7.2
Blaine	7.0	Fort Yellowstone	22.9
Bridgeport	10.2	Lander	5.7
Colfax	20.4	Saratoga	7.0
Crystal Springs	5.0	Sheridan	14.0
Davenport	6.0	Sundance	5.0
Dayton	5.5		
East Clallam	6.0		

DEPTH OF SNOW ON GROUND.

The depth of unmelted snow lying on the ground on the first Monday of each week during the winter season is shown by a series of weekly maps published by the Weather Bureau, beginning with Monday, December 4, 1893, based upon telegraphic reports received from a comparatively few selected stations.

The accompanying chart, No. VII, gives the depth in inches of snow lying on the ground on November 30 at nearly a hundred stations, selected from among several hundred that report the presence of more or less snow. The irregularities of distribution are so great that it seems hardly practicable to draw lines of equal snow depth, and yet an attempt has been made to indicate the zone where a trace of snow is still left on the ground. The line of 5-inch depth has also been

drawn through regions where reports are sufficiently numerous to indicate that the general average depth is not less than that amount. The maximum depths are from 12 to 20 inches in the upper peninsula of Michigan; from 5 to 36 inches in the western portion of the lower peninsula of Michigan; from 10 to 12 inches in northern Wisconsin and northern Minnesota; from 6 to 20 inches in western Montana, northern Idaho, and eastern Washington; from 10 to 40 inches in the mountainous parts of central Colorado. The data for the 15th shows that on that date the maximum depths of snow were: 20 in Colorado; 10 in Upper and Lower Michigan; 10 to 18 in western New York; and 4 in Vermont.

The following table shows the depth of snow on the ground on the 15th and the 30th of the month for stations reporting 5 inches, or more:

Depth of snow on ground on the 15th and at the close of the month.

State and stations.	15th.	30th.	State and stations.	15th.	30th.
<i>Colorado.</i>			<i>Minnesota.—Cont'd.</i>		
Breckenridge	6.0	30.0	Winona	0.0	7.0
Climax	20.0	39.0	<i>Montana.</i>		
Dumont	0.0	6.0	Choteau	0.0	10.0
Gold Hill	10.0	10.0	Elk Park	5.0	20.0
Loveland	3.0	6.0	Fort Logan	0.0	6.0
Moraine	0.0	6.0	Great Falls	0.0	5.4
Red Cliff	(?)	12.0	Helena	0.0	6.0
Steamboat Spring	0.0	5.0	Martinsdale	0.0	6.4
<i>Idaho.</i>			Miles City	0.0	5.0
Kootenai	9.0	13.5	<i>Nebraska.</i>		
Lake	0.0	12.0	Agee	0.0	5.0
Murray	6.0	18.0	Hartington	0.0	7.0
<i>Illinois.</i>			Lynch	0.0	5.0
Dixon	0.0	5.0	<i>New Hampshire.</i>		
Oregon	0.0	5.5	Berlin Mills	6.0	Trace.
Riley	0.0	8.0	<i>New York.</i>		
Sycamore	0.0	8.0	Arcade	10.0	Trace.
Winnebago	0.0	8.0	Eden Center	18.0	0.0
<i>Iowa.</i>			Humphrey	12.0	10.0
Andubon	0.0	6.0	Varysburg	6.0	0.0
Belle Plaine	0.0	6.0	<i>North Dakota.</i>		
Cedar Rapids	0.0	6.5	Fargo	0.0	6.0
Charles City	1.0	5.0	McKinney	0.0	5.0
Des Moines	0.0	8.0	Power	0.0	5.0
Dubuque	Trace.	6.5	Sheyenne	1.0	10.0
Grand Meadow	0.0	7.0	Woodbridge	0.0	6.0
Hampton	0.0	6.5	<i>South Dakota.</i>		
Iowa City a	0.0	5.5	Huron	0.0	5.5
Larrabee	2.0	5.0	<i>Washington.</i>		
Mechanicsville	0.0	9.0	Bridgeport	0.2	9.5
Monticello	0.0	8.0	Davenport	4.0?	6.0?
Newton	0.0	6.0	Ellensburg	0.0	9.0
Tipton	0.0	6.0	Fort Simcoe	0.0	14.0
<i>Maine.</i>			Fort Spokane	Trace.	11.0
Easton	0.0	8.0	Lakeside	0.0	11.0
<i>Michigan.</i>			Moxee Valley	0.0	5.0
Bear Lake	2.5	6.0	Pullman	0.0	6.0
Bellaire	6.4	10.0	Rosalie	0.0	5.0
Berrien Springs a	1.0	5.0	Waterville	0.0	6.0
Berrien Springs b	0.0	5.0	West Ferndale	0.0	5.0
Boon	4.0	17.0	<i>Wisconsin.</i>		
Calumet	5.0	20.0	Amherst	0.0	14.0
Cheboygan	5.0	7.0	Baraboo	0.0	7.0
Gaylord	10.0	36.0	Belleville	Trace.	8.0
Harbor Springs	5.0	12.0	Beloit	0.0	8.0
Harrison	1.0	6.0	Butternut	Trace.	6.0
Lathrop	0.0	10.0	Cadiz	0.0	5.0
Lewiston	1.0	10.0?	City Point	1.0	10.0
Lodi	(?)	12.5	Delavan	0.0	9.8
Marquette	0.1	12.2	Estella	0.0	10.5
Sault Ste. Marie	10.2	12.0	Florence	0.0	12.0
<i>Minnesota.</i>			Fond du Lac	0.0	10.0
Ada	0.0	11.0	Grantsburg	0.0	7.0
Alexandria a	0.0	7.0	Green Bay	0.0	8.1
Alexandria b	0.0	6.0	Harvey	0.0	8.5
Bloomington	0.5	5.5	Hayward	0.0	7.0
Caledonia	0.0	7.0	Koepenick	0.0	12.0
Cambridge	0.0	5.0	Madison	0.0	5.0
Clear Lake	0.0	6.0	Medford b	0.0	9.0
Collegeville	0.0	9.0	Menomonie	Trace.	5.0
Farmington	0.0	7.0	Neillsville	0.0	12.0
Grand Meadow	Trace.	5.0	New Holstein	0.0	14.0
Lake Winnibigoshish	0.0	10.0	Oconomowoc	0.0	6.0
Leech Lake	0.2	7.0	Osceola	0.0	6.0
Long Prairie	0.0	12.5	Pepin	0.0	7.0
Maple Plain	0.0	7.0	Reedsburg	0.0	8.0
Marfield	1.2	8.0	Sharon	Trace.	10.0
Mazeppa	0.0	6.0	Shawano	0.0	8.0
Minneapolis (W. B.)	Trace.	5.5	Sparta	0.0	5.2
Minneapolis a	0.2	8.0	Stevens Point	Trace.	8.0
Minneapolis b	Trace.	6.0	Valley Junction	Trace.	5.0
Minneapolis c	0.0	5.0	Viroqua	0.0	9.0
Minnesota City	Trace.	5.0	Watertown	0.0	6.5
Pokegama Falls	1.0	5.0	Waukesha	0.0	6.5
Red Wing	Trace.	5.5	Westfield	0.2	6.0
Royalton	0.0	8.0	Weston	0.0	10.0
Saint Charles	0.0	7.0	Whitehall	3.0	9.0
Saint Cloud	0.0	8.0	<i>Wyoming.</i>		
Saint Paul	0.0	5.4	Big Horn Ranch	0.0	8.0
Sauk Center	Trace.	7.0	Sheridan	0.0	5.0
Wabasha	0.0	6.0			

HAIL.

Hail was reported as follows: 1st, 4th, and 6th, Nevada. 7th, Oklahoma and Texas. 8th, Texas. 9th, Washington. 17th, California. 19th, Arizona. 20th, Louisiana. 21st, Georgia, Oregon, and Tennessee. 24th, California and Nevada. 25th, Arizona, California, Louisiana, and Nevada. 26th, Alabama, Louisiana, and Tennessee. 27th, Alabama and Tennessee. 28th, Utah. 29th, Ohio.

SLEET.

Sleet was reported as follows: 1st, Kansas, Maryland, and Minnesota. 2d, Illinois and Michigan. 3d, Kansas and Missouri. 4th, Connecticut, Massachusetts, and New Jersey. 6th, New York and South Dakota. 9th, Idaho and Washington. 10th, Colorado and South Dakota. 11th, Iowa, Kansas, and Nebraska. 12th, Iowa, Kansas, Missouri, and Wisconsin. 13th, Colorado and Wisconsin. 14th, Alabama, Arkansas, Kentucky, Mississippi, Nebraska, North Carolina, and Texas. 15th, Kentucky, Massachusetts, New Hampshire, Pennsylvania, and Washington. 16th, Idaho, Montana, and South Dakota. 17th, California, North Carolina, and South Dakota. 18th, Arizona and Ohio. 19th, Arizona, Tennessee, and Washington. 20th, Arkansas, Illinois, Iowa, Massachusetts, Montana, Nebraska, North Carolina, Virginia, and Washington. 21st, Georgia, Idaho, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, New York, North Carolina, Ohio, South Carolina, South Dakota, Virginia, Washington, and Wisconsin. 22d, Michigan and Mississippi. 23d, Michigan, Nebraska, Tennessee, Utah, and Virginia. 24th, California, Iowa, Nevada, and North Carolina. 25th, Arizona, Arkansas, Iowa, Kansas, Missouri, Nevada, South Dakota, and Utah. 26th, Arkansas, Colorado, Illinois, Iowa, Michigan, Minnesota, Missouri, North Carolina, Ohio, Wisconsin, and Wyoming. 27th, Illinois, Iowa, Maryland, Michigan, New York, North Carolina, Ohio, West Virginia, and Wisconsin. 28th, Idaho, Indiana, Iowa, Maryland, Michigan, Nebraska, New York, Ohio, and Wisconsin. 29th, Idaho, Illinois, Iowa, Maryland, Missouri, Nebraska, New York, Washington, and Wisconsin. 30th, Idaho, Iowa, Kansas, Nebraska, and Washington.

FOG.

On the 7th during a dense fog over Lake Huron 2 vessels collided off Point aux Barques. Both vessels sank in a short time, and the crew of one, consisting of 24 persons, was drowned.

On the 9th at Grand Haven, Mich., a dense fog interrupted navigation on the lake. At Chicago, Ill., the fog prevailed during the 8th and 9th. Traffic on the streets and railroads was seriously interfered with and a number of wrecks occurred. Navigation on the lake and river was almost entirely suspended. At Detroit, Mich., the dense fog delayed navigation in the morning.

On the 11th at Cincinnati, Ohio, a dense fog caused interruptions to street traffic, and river navigation was suspended.

WET AND DRY SEASONS.

The character of the season as to precipitation in its relation to agriculture is shown in the following extracts and reports:

California.—As winds from the interior are frequently reported to have produced great drought and destruction among tender fruits in California, the following items have been collected with regard to the remarkable northerly gale of the 17th; whenever such winds descend into valleys from the summits of the higher ridges they have the nature of the Föhn wind, being warm and dry, as at Napa City; but under other circumstances they may descend more slowly and become very cold, dry winds; in either case the dryness is apt to produce such rapid evaporation from the tender leaf surface that great injury is done to plants.

Fallbrook: the wind shifted from southerly to cold northerly on the 17th,

and at sunset snow was falling at points above 900 feet altitude; this is the first snowstorm since January, 1881. Julian: a rainstorm with west wind on the 17th; at sunset the wind shifted to east and snowfall began. Lick Observatory: the cold northwest winds of the 16th and 17th gave maximum velocities of 80 miles hourly, and gusts of 100 miles. Lodi: 16th, 8.30 p. m., north wind began, increasing to a gale by midnight. Napa City: 16th, 9.55 p. m., wind suddenly changed to a northerly gale; temperature rose 14° in five minutes and then gradually declined. Niles: on the 17th, late in the evening, strongest wind experienced for 42 years. Pasadena: 17th, 9 p. m. to 9.30 p. m., temperature fell from 55.5° to 39°; wind changed from light southeast to high northwest, with heavy rain and hail and followed by light frost. San Jacinto: snowstorm 17th from 5 to 6 p. m. Turlock: destructive northerly gale on 17th.

Georgia.—Rainfall has been deficient in the interior and the soil exceptionally dry, and therefore warm, so that the more hardy annual vegetation had not been killed by the end of the month.

Indiana.—Traces of snow were noted on the 15th and a few other days, and the weather was exceedingly favorable to farm work and crops. Winter wheat is in the best condition to stand severe winter weather, being deeply rooted and vigorous.

Maryland.—The ground is in fine condition and weather very favorable for farm work.

Mississippi.—Rains were more frequent than during October, but had very little effect in retarding field work; most of the crops have been harvested under the most favorable circumstances.

Nevada.—The lack of sufficient moisture has allowed the feed to dry up

and, in some localities, considerable anxiety is felt for the stock; the record for the snowfall was very light compared with November, 1893.

Ohio.—Precipitation was deficient but well distributed and generally sufficient for cereals; snowfall was light but fell opportunely and gave considerable protection to the wheat.

Oklahoma.—The dry weather of October caused immense prairie fires, and the wet weather and severe frosts of November prevented any growth of grass, hence the cattle ranges are poor.

South Carolina.—The soil is favorable for seeding wheat and oats; copious showers kept the ground in good condition for working and also aided germination.

South Dakota.—Up to the 20th the ground averaged bare although snows had fallen and, therefore, stock could generally feed on the range; after the 20th snows were more frequent and generally staid on the ground and it began to be necessary to feed the stock.

Virginia.—The rainfall near the coast was nearly twice the normal, decreasing to the western portion of the state, where it was less than half the normal; the weather has generally been favorable for farm work.

Wisconsin.—The snowfall has been heavy and the total precipitation quite evenly and advantageously distributed, although the first ten days were not specially favorable to agriculture, as the ground was too dry for fall seeding. After the snow fell it gave complete protection to growing grain during the severely cold weather that prevailed during the last ten days of the month.

Wyoming.—Grass on the ranges has been cropped rather short; if the present early snows are reinforced by additional snowfall it will go hard with the cattle on the ranges.

WIND.

The prevailing winds in November, 1893, viz., those that were recorded most frequently, are shown on Chart II by arrows flying with the wind. Northwest winds prevail as usual in the Northwest and Missouri Valley and easterly winds in the south Atlantic and Gulf states.

HIGH WINDS.
(In miles per hour.)

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Weather Bureau as follows:

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Amarillo, Tex	11	60	n.	Keeler, Cal	18	60	ne.
Do	28	52	sw.	Kittyhawk, N. C	8	58	ne.
Do	30	58	n.	Do	9	54	n.
Block Island, R. I	10	50	ne.	Do	27	54	sw.
Buffalo, N. Y	28	53	sw.	Lander, Wyo	28	50	sw.
Do	22	50	w.	Lexington, Ky	29	50	sw.
Colorado Springs, Colo	21	65	nw.	Pensacola, Fla	27	50	se.
Do	31	57	nw.	Pikes Peak, Colo	21	55	w.
Chicago, Ill	17	51	sw.	Do	23	84	nw.
Dodge City, Kans	25	54	se.	Do	25	84	sw.
Eastport, Me	28	57	se.	Do	29	90	sw.
Fort Canby, Wash	8	68	s.	Do	30	104	sw.
Do	9	68	s.	Tatoosh Island, Wash	6	50	s.
Do	10	70	s.	Do	13	50	e.
Do	19	70	s.	Do	22	59	e.
Do	20	64	se.	Do	23	86	e.
Do	22	58	se.	Do	25	50	nw.
Do	23	66	se.	Do	28	50	e.
Do	24	72	sw.	Do	29	57	w.
Do	25	72	se.	Winnemucca, Nev	24	57	sw.
Do	26	89	se.	Do	28	58	sw.

LOCAL STORMS.

6-8th.—A heavy storm of wind and rain prevailed along the Pacific coast from northern Washington to San Francisco, Cal. At Fort Canby, Wash., the wind reached a maximum velocity of 68 miles per hour. Near Lake Cushman, Wash., damage was done by the heavy rain. Railroad traffic was delayed for several days and trains on the Northern Pacific Railroad did not run until the 10th. Six spans of the Northern Pacific trestle near Clarks Fork Station, Mont., were washed out on the 8th.

8-9th.—At Norfolk, Va., a heavy northeast storm began the early morning of the 8th and continued until the morning of the 9th. The wind reached a maximum velocity of 34 miles per hour, and the rainfall was exceptionally heavy, 5.77

inches falling during the storm. Minor damage was done to buildings.

13th.—An unusually severe storm prevailed in Delaware. A number of houses were blown down and one person was killed. Several wrecks occurred in Chesapeake Bay.

15-16th.—Heavy snow storms prevailed in New York and Pennsylvania. At Oswego, N. Y., snow began the evening of the 15th and continued until the early morning of the 16th, accompanied by high wind. A schooner broke adrift from the outer breakwater, and a tug going to her assistance was blown into shoal water. Both vessels were a total loss, and the captain of the tug was drowned. At 3.49 a. m. of the 16th a violent gust struck the city, attended by a heavy fall of sleet. The storm seemed to be a diminutive tornado, its approach and departure being attended by a heavy rumbling sound like a train of cars. No exceptionally high wind was recorded at the Weather Bureau office. A house was partially destroyed, and in the same vicinity other damage was done. A schooner in the harbor was damaged during the passage of this storm, the captain of the vessel reporting the wind very high. At Dunkirk, N. Y., the snowfall was very heavy. Business was interrupted and railroad trains delayed.

17th.—A northwest gale occurred on Lakes Superior, Huron, and Michigan, and on Lake Erie the wind was strong from the southwest. No boats ventured out from Buffalo. At the head of Lake Superior the storm was accompanied by snow. Heavy rain and wind storms prevailed in central California. At San Francisco high north wind in the early morning reached a maximum velocity of 47 miles per hour. Several houses were unroofed and damage was done to houses in the bay. At Sonoma high wind blew roofs from barns and did other damage. In Stanislaus County the gale was very destructive. At Centerville a very severe storm in the early morning did a great amount of damage. At Mount Hamilton the wind reached a maximum velocity of 80 miles per hour, with gusts of over 100 miles. At Lodi the storm began the night of the 16th and increased to a gale at midnight; outbuildings were unroofed and other damage done. At Kelseyville the gale damaged trees. At Fruitvale a house in course of erection was demolished and fences and trees blown down.

21st.—The first blizzard of the season occurred in Minnesota on November 21, and advanced southeastward into Illi-